Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Implementation of the Local Competition Provisions in the Telecommunications Act of 1996	)	**CC Docket No. 96-98**
	)	
	)	

[redacted]

SUPPLEMENTAL COMMENTS OF THE UNITED STATES TELEPHONE ASSOCIATION

The Commission has invited comment on a model that claims to "allow the user to simulate the relative impact of particular changes in the industry."[1] While the Commission does not say for what purpose it intends to employ this model, as the attached affidavit of Dr. William Taylor makes clear, the model has significant drawbacks and "cannot be used as it stands as a basis for making policy decisions" on the issues before the Commission in this docket.[2] Moreover, because the model is so dependent on specific assumptions not released for comment, the Commission would have to give additional notice and opportunity to comment on the specific assumptions used before it could rely on the output to justify a policy decision. Despite the model's flaws, however, the model does demonstrate that a policy misstep by the Commission such as underpricing unbundling and resale or allowing arbitrage to avoid the fair price of services could result in devastating financial consequences for incumbent local exchange carriers ("ILECs") and their customers. Moreover, USTA has confirmed this result with an independent model. A report concerning that independent model is attached as Exhibit B.

Limitations of the Model

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[1] Public Notice, DA 96-1007, "Supplemental Comment Period Designated for Local Competition Proceeding, CC Docket 96-98" (rel. June 20, 1996).

[2] Affidavit of William E. Taylor, ¶ 3 ("Taylor Affidavit") attached as Exhibit A.

The model released by the Commission staff is a series of equations that, when provided with specific inputs, will project fifteen years of financial results for ILECs, Competitive Local Exchange Carriers ("CLECs") and Interexchange Carriers ("IXCs"). Unfortunately, and perhaps of necessity, the only way such projections can be made is by heavy reliance on assumptions that must be fed into the model. Moreover, the construct of the model does not allow for many of these assumptions to interact. So, for example, the model does not reconcile changes in ILEC shares of the loop market with changes in LEC retail prices or changes in the prices the CLEC pays for unbundled loops.[3]

In his analysis of the model, Dr. Taylor identified a number of other concerns that undermine the model's use as a policy tool. The model ignores variances in cost, both among LECs and within specific areas served by LECs.[4] Similarly, the model fails to recognize that LEC competitive losses will be concentrated among lower cost customers. The model "omits any treatment of local interconnection charges -- both those imposed by LECs on CLECs and by CLECs on LECs."[5] Thus, it cannot be used to evaluate the impact of various interconnection proposals. The model also fails to take into account in any direct manner, the impact of resale.[6]

Dr. Taylor also identified an number of errors and omissions in the model. These range from errors in equations that may be correctable, to more fundamental errors, such as a failure to recognize that long distance calls originating on a LEC network need not terminate on that network, but may migrate to a CLEC

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[3] ***See*** Taylor Affidavit, ¶ 7.

[4] Taylor Affidavit, ¶ ¶ 3, 8.

[5] Taylor Affidavit, ¶ 9.

[6] Taylor Affidavit, ¶ 9.

network.[7] The model ignores both the loss of access revenue and the cost of interconnection for such a call. In addition, the model also uses internally inconsistent assumptions for inputs such as depreciation.[8]

The Commission Has Not Given Adequate Notice of Its Use of the Model

The comment Notice does not suggest how the Commission proposes to use the model. Regardless, the Commission has given insufficient documentation or notice of the assumptions that it would use to drive the model to a financial result. Indeed, not only is the model "entirely undocumented," but the Commission specifically removed the key inputs to run even a base case -- a foundation scenario that sets a base line to evaluate future changes.[9] For many variables the Commission has inserted a dummy value of 1919. Thus, the model as presented is driven more by the current address of the Commission offices than by financial data of the telecommunications industry. Moreover, the Commission has given no notice of what data it is considering to use for the key policy assumptions that are necessary to drive the model's results.

As a result, the Commission has not provided sufficient notice to comply with the Administrative Procedure Act ("APA").[10] "The purpose of notice under the APA is to disclose the thinking of the agency and the data relied on."[11] Here, the Notice provides neither. As a result, the Commission cannot utilize previously undisclosed inputs to the model and then rely on the model's output as a justification of a policy decision in this docket.

The Model Does Demonstrate the Potential Negative Impacts of Bad Policy Choices.

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[7] ***See*** Taylor Affidavit, ¶¶ 9-11, 29.

[8] Taylor Affidavit, ¶ 17

[9] Taylor Affidavit, ¶¶ 4.

[10] ***See*** 47 U.S.C. § 553(b).

[11] Lloyd Noland Hospital and Clinic v. Heckler, 762 F.2d 1561, 1565 (11th Cir. 1985).

While the Commission cannot create new assumptions for the model without additional notice, it can take into account model results that are put into the public record. In particular, Dr. Taylor examined the model results for several policy scenarios under consideration by the Commission. While reliance on exact forecasts would ignore the deficiencies in the model, the results found by Dr. Taylor are generally consistent with economic testimony in this docket that the wrong policy choices by the Commission could cause serious financial harm to the LEC industry, thereby undermining robust competition.[12] In addition, consumers would be hurt by such a dramatic change because the ILEC revenue loss would put pressure on the prices for other ILEC services and the under-priced facilities would undermine the incentives for ILECs and competing facilities providers to invest in new or improved networks.[13]

As a further check, USTA retained LECG and Dr. Robert Crandall to create an independent model ("LECG Model").[14] The baseline of the LECG model is premised on current investment analyst expectations for the telecommunications industry. Like the model released by the Commission staff, the LECG model contrasts various policy options with the baseline. Unlike the model released by the Commission staff, the LECG model recognizes the interrelationship between service price and customer choice of carrier. The LECG model also distinguishes between resale of services and sale of unbundled facilities.

In particular, both models examined four scenarios, each scenarioreplete with policy missteps. Under the most extreme scenario, unbundled elements are priced are an artificially low level (TSLRIC based on Hatfield model estimates), resale is discounted at 35%, and bypass of terminating access charges is allowed. While none of these policy choices have a legitimate economic foundation, if the Commission were

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[12] Affidavit of Professor Jerry A. Hausman, ¶¶ 4-16 ("Hausman Affidavit"), attached to Implementation of Local Competition Provisions in the Telecommunications Act of 1996, CC Docket 96-98, Comments of the United States Telephone Association (filed May 16, 1996).

[13] See Hausman Affidavit, ¶¶ 2, 9-13.

[14] The LECG Model demonstrates impacts on the RBOCs and GTE, but does not represent impacts on mid-size and small LECs. See LECG Report, Exhibit B.

nevertheless to put in place such a regime, both its own model and the LECG model confirm the devastating results. For example, the FCC Staff Model projects overall LEC revenue losses of more than 12% by 1998. The LECG Model shows similar short term results and, by 2000, revenue losses of more than $83 billion, including revenues that contribute towards covering common costs of running a ubiquitous network.[15] Not surprisingly, such losses would have a dramatic impact on LEC equity values, reducing current values by more than 40%.[16]

Respectfully submitted,
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[15] Even without the confluence of bad policy choices, individual policy missteps can have dramatic impact. For example, if the Commission were to allow competitors to purchase ILEC vertical services as unbundled elements, rather than resale services as required by statute, the FCC staff model projects ILEC revenue losses of $1.4 billion. Taylor Affidavit, ¶11.

[16] Taylor Affidavit, ¶ 36. LECG report at 15.

AFFIDAVIT OF WILLIAM E. TAYLOR

I. INTRODUCTION AND SUMMARY

1. My name is William E. Taylor. I am Senior Vice President of National Economic Research Associates, Inc. (NERA), head of its telecommunications economics practice and head of its Cambridge office. My business address is One Main Street, Cambridge, Massachusetts 02142. I have participated in numerous proceedings before the Federal Communications Commission (FCC), including the recent Local Exchange Carrier (LEC) Video Cost Allocation docket where a summary of my qualifications can be found.[1]

2. I prepared this affidavit at the request of the United States Telephone Association in response to the Public Notice[2] of June 20, 1996. That notice established a supplemental comment period in CC Docket No. 96-98 to address an "Industry Demand and Supply Simulation Model" (the IDSS model) prepared by the staffs of the Industry Analysis and Competition Divisions of the Common Carrier Bureau and Office of General Counsel, respectively.

3. In my opinion, the model cannot be used as a standalone tool for evaluating policy decisions concerning LEC interconnection. First, it oversimplifies the telecommunications industry. For example, it calculates financial effects of interconnection policies for a single aggregate LEC, while those policies will have different financial effects on LECs serving different geographic areas and different mixes of customers. The relationships among prices and market shares are specified entirely outside the IDSS model. For example, the model allows the user to input assumptions about cream-skimming of toll services by new entrants, but there is no provision for cream skimming by entrants into the local market. Second, the model does not explicitly address termination of local calls or resale of local exchange service, and it appears to miscalculate the effects of bypass on terminating access charges. Third, as with any model, its results are

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[1] "Allocation of Costs Associated with Local Exchange Carrier Provision of Video Programming Services," Notice of Proposed Rulemaking, CC Docket No. 96-112 (May 10, 1996). My vita is contained in the Affidavit of William E. Taylor (Attachment 1), which was filed with the Comments of Southern New England Telephone Company, May 31, 1996.

[2] "Supplemental Comment Period Designated for Local Competition Proceeding, CC Docket No. 96-98," Public Notice ("Notice"), released June 20, 1996.

sensitive to the specification of unknown and possibly unknowable parameters. All of these factors severely limit the value of the model as a precise policy guide. Notwithstanding these problems, if the model is populated with reasonable parameter values and used to simulate the effects of policy decisions, the model clearly shows that policies that threaten LEC carrier access or vertical services revenues can have devastating effects on LEC income and earnings.

4. The model is large, detailed, complex, unorganized and entirely undocumented. Many of its assumptions and parameters are expressed implicitly — embedded in formulas inside individual cells — rather than explicitly as specifications to be chosen by the user. The descriptions of inputs to the model are sometimes obscure, and reasonable values could only be inferred by examining the model to see how the variable was used. Much of the basic data was removed from the spreadsheet before it was disseminated and had to be repopulated. As a result, it is possible that some portion of the analysis below reflects our misunderstanding of the model's workings or intentions rather than true shortcomings or errors. This review of the IDSS model should be taken with that limitation in mind.

5. Finally, while we have used assumptions in an effort to produce plausible results in the base case,[3] other assumptions produced implausible results in the model. Small deviations in some specifications produce very different outcomes, as shown in Table 2. For example, a ten percentage point difference in the proportion of LEC one-stop shopping customers leads to a difference in LEC earnings of $6 billion per year by the year 2006. In addition, the fact that relative prices and market shares can be specified independently as inputs to the model means that — within the model — changes in relative prices have no effect on market shares. Thus, inconsistent assumptions can be used to produce unreasonable results.

6. In reviewing any model, one must know the questions it is supposed to answer and the uses to which the answers are likely to be put. As the Public Notice is silent regarding these matters,[4] I have assumed that it will be used to quantify the financial effects of policy decisions under

[3] For example, small changes in prices and market shares have the expected effects on revenue and earnings.

[4] The Notice states that users can "calculate a variety of outputs from nearly 200 specifications," "specify growth rates, pricing trends, demand elasticities and cost relationships to simulate effects in traditional industry segments," and "simulate the relative impact of particular changes in the industry."

consideration in CC Docket No. 96-98, which I take to be the effects of different prices (and other terms and conditions) for network elements and services sold by incumbent LECs to other carriers, including unbundled network elements, reciprocal termination of local traffic, long distance carrier access, collocation, and the pricing of retail services for resale. The model approaches these questions by comparing financial results under a base case — essentially current conditions — with those under various competition scenarios, created by the user by specifying prices of retail and wholesale services, growth of market demands, changes in market shares for different competitors and changes in costs. Thus, the user enters current demands and growth rates for services, current and likely future prices, current and future costs, and future market shares for the LEC, the competitive local exchange carrier (CLEC) and the interexchange carrier (IXC). The model adjusts some — but not all — of these assumptions to make them mutually more consistent: for example, it accounts for changes in aggregate market demand caused by changes in prices, or changes in retail prices stemming from changes in access prices or changes in costs. It does not adjust other assumptions, such as reconciling changes in LEC shares of the retail or wholesale loop markets with changes in LEC retail prices or changes in the prices the CLEC pays for unbundled loops.

7. The IDSS model is thus more of an accounting simulator than a behavioral economic model in which the actions that are critical for policy evaluation are a result of the model, rather than an assumption.[5] In the IDSS model, the user makes assumptions independently about prices and customer choices, and the model calculates the financial implications of those assumptions. The critical interplay of prices and demand in competitive markets is performed at the assumption stage of analysis, and it is not produced by the model itself. In addition, we find the results of the IDSS model to be quite sensitive to some of these specifications, and because they are either

[5] A good example of a behavioral model would be the current models of the effects of rate rebalancing — increases in subscriber line charges offset by lower toll rates — on the demand for residential subscription to telephone service. (See, e.g., J.A. Hausman, T. Tardiff and A. Belinfante, "The Effects of the Breakup of AT&T on Telephone Penetration in the United States," *American Economic Review*, Vol. 83, 1993.) In that analysis, the model examines past behavior statistically and measures the trade-offs customers actually make in determining whether to subscribe to telephone service when local rates rise but are offset by lower toll rates. At the very least, a behavioral economic model should exhibit reasonable relationships among prices and quantities demanded.

unknown (e.g., assumptions about future events) or unknowable (e.g., the skewness of usage for CLEC customers), the fundamental accuracy of the model is questionable.

8. An additional difficulty in using the IDSS model to evaluate policy options in CC Docket No. 96-98 is that — by the way it is constructed — it cannot address several important policy issues. First, by treating LECs as a single aggregate, it (i) masks important differences across LECs and (ii) produces a biased estimate of the average financial effects experienced by LECs. It uses a single incremental cost input for residential loops and one for business loops and thus cannot address problems of LECs that serve high cost, low density areas. Since loop costs vary considerably, this omission would be a major source of error inherent in the model if its results were to be applied to individual firms. Similarly, a key financial component of the model is driven by the trade-off between the reduction in local exchange market share and the increase in interLATA long distance market share. The model thus calculates the outcome for an aggregate LEC having customers with average interLATA usage per line.[6] LECs having customers with a different demand profile would experience very different financial results from local interconnection. Because financial effects are non-linear functions of demand and market share, the financial success of the average aggregate LEC — which is what the model calculates — is different from the average financial success of LECs if the model were applied to each of them independently.[7] Thus the model will give a biased picture of the outcome of applying interconnection policy changes to each individual LEC.

9. Second, the model crosses jurisdictional boundaries, including in it, prices and policies which are not under the jurisdiction of the FCC. The actions of state regulators in response to federal policy changes — e.g., changes in local rates or implementation of a state universal service

[6] The model specifies a usage distribution for seven classes of residential service and three classes of business service, but this single usage distribution applies to the entire local exchange industry. A LEC whose usage distribution is more concentrated than average will experience greater financial effects from competition than shown in the model.

[7] Consider two rectangular farms, one measuring 1 furlong wide and 2 furlongs long and the second measuring 3 by 4 furlongs, respectively. The "average" farm measures 2 by 3 furlongs [averaging widths of 1 and 3 and lengths of 2 and 4] so its area is 6 square furlongs. However, the average area of these two farms is 7 square furlongs [averaging areas of 2 and 12]. Thus, the area of the average farm is different from the average area of the farms. Since the average farm is purely hypothetical, we would only care about the average area of farms for policy purposes.

fund — are thus ignored by the model. In particular, the model omits any treatment of local interconnection charges — both those imposed by LECs on CLECs and by CLECs on LECs. For LECs, this omission makes it impossible to evaluate the effects of interconnection proposals such as bill and keep, and it ignores changes in both costs (incremental termination costs on the LEC's network and the price to the LEC to terminate calls on the CLEC's network) and revenues (from CLECs' terminating traffic on the LEC network) which are a certain consequence of interconnection policy decisions. Third, while the model does segment business and residential markets by usage volumes to account for the higher overall profitability of high-volume customers, it omits the cost side entirely. Thus LECs that serve lower-cost customers than the national average will find the model understates the financial consequences of losing a customer to a CLEC. In addition, the model does not directly account for the competitive consequences of the variation in costs within the LEC's service territory when the LEC will be required to set geographically uniform retail or wholesale service prices. Fourth, the model does not explicitly address resale of local exchange service, including vertical services. In particular, the policy question concerning arbitrage between sets of unbundled network elements and resale of retail services cannot be directly addressed. Fifth, the model understates the competitive exposure of LEC carrier access revenues because it does not address the ability of IXCs to terminate long distance traffic to CLECs which then use LEC local interconnection to terminate the traffic.[8] Sixth, by reporting financial results in local exchange and long distance markets combined the model conceals possible efficiency losses (e.g., from stranded plant) in the local exchange market. Seventh, the model assumes that LECs will retain originating access charges from CLEC customers served by unbundled LEC loops. Finally, the model sheds no light on competitive issues. The effect of important FCC policy decisions regarding

- unbundled loop prices or the avoided cost discount for resale prices, and
- the relationship between local interconnection and carrier access charges

[8] This form of arbitrage is potentially very important because it could happen instantly. If FCC and state policy permitted, IXCs could terminate long distance traffic through CLECs so that LEC carrier access revenues would be replaced by local interconnection revenues. Because the CLEC could use LEC facilities to terminate traffic to LEC customers, the potential extent of this bypass would not depend at all on the CLEC's market share of loops.

on the development of local exchange competition cannot be measured or forecast by the model. Rather, the model takes an assumed outcome of that competitive process and calculates the financial consequences for the market participants

10. There is also a conceptual problem with the financial modeling of local competition and carrier access charges. As we understand the model, all long distance calls originating with a LEC residual customer are treated as if they terminate to a LEC customer. In reality, a fraction of those calls — depending on the CLEC market share of loops and the skewness factor — will terminate on a CLEC network.[9] Ignoring this fraction overstates LEC terminating access revenues when CLECs have a substantial competitive presence. Along the same lines, in the model, the LEC makes no payments to the CLEC to terminate calls originated by its proprietary customers. This view of interconnection overstates LEC network costs because it assumes the LEC terminates the traffic but it understates the LEC's actual termination cost because it ignores the CLEC charge for terminating access.

11. What is clear from the financial calculations in the model is the sensitivity of LEC financial results — e.g., revenues, earnings or earnings before interest, taxes, depreciation and amortization (EBITDA) — to the treatment of carrier access charges. An upper bound on the financial effects of interconnection policy regarding carrier access charges can be obtained simply by setting switched access prices to zero; in the model, that exercise reduces LEC EBITDA in the year 2000 by about 24 percent, from about $59 billion to about $46 billion. If carrier access prices are reset to roughly the incremental cost of switched access (about $0.005 per minute in 1996[10]) — with no other changes — the model implies a reduction in LEC EBITDA of about 22 percent. In addition, carrier access revenues are not the only LEC revenues that may be threatened by interconnection. If CLECs can purchase LEC vertical services as unbundled network elements at prices close to total service long run incremental cost (TSLRIC), LEC losses in revenue and earnings would be approximately $1.4 billion in the year 2006.

[9] That is, if the CLEC market share of access lines is 5 percent, one would expect roughly 5 percent of long distance calls to terminate on CLEC access lines.

[10] This is a NERA estimate for an access minute which may be on the low side. Obviously these incremental costs can vary widely across jurisdictions or technologies and none of that variation is reflected in the model.

12. In the balance of these comments, we first describe the economic structure of the model as we understand it, showing the determination of demand and supply for retail residential and business services and wholesale services and the determination of prices and costs in the model. From this basis, we next examine the absence of pieces of the telecommunications puzzle from the model, in particular, the relationship between prices and market penetration and the role of local interconnection. In Section III, we identify several reasons why the model cannot be used to predict important public policy decisions. As a contribution to the improvement of the model, and as a warning to users of the model as it was released, in Section IV, we address apparent errors and omissions discovered to date.[11] Section V shows the sensitivity of the financial results of the model to the specification of unknown or unknowable parameters. These findings suggest that great care must be used in specifying parameters, that the results of the model cannot be taken literally, and that implementation of any interconnection policy in the real world is likely to have very different effects on different telephone companies. In Section VI, we use the model to attempt to address the principal mechanisms by which interconnection policies could affect LEC financial results through avoidance of carrier access charges.

II. MODEL DESCRIPTION

13. The model describes a U.S. domestic telecommunications sector that is supplied by three companies: a LEC, a CLEC and an IXC for the period 1993 - 2010. Retail services are supplied by all three competitors. The LEC and the CLEC provide retail loops, intraLATA toll, interLATA toll and vertical services to business and residential customers.[12] and the IXC sells inter and intraLATA toll to the same customers. In the wholesale markets, the LEC sells unbundled loops, local interconnection and vertical services to CLECs and switched and special carrier access to IXCs. The LEC buys resold interLATA toll minutes from IXCs. CLECs buy unbundled local loops from LECs (and also build their own) and pay (per minute) local interconnection charges and carrier

[11] Given the complexity of the model and its lack of documentation, we would expect that additional errors are present and would be uncovered were the model used for policy purposes.

[12] In addition, the LEC supplies retail private line service and "other" services are supplied by the LEC, CLEC and IXC. In the model, LEC revenues from these services remain with the LEC in all scenarios and, indeed, grow over time, offsetting competitive losses in local exchange service.

access charges to the LEC.[13] IXCs buy switched and special access from LECs and CLECs and sell wholesale toll services to LECs.

A. Demand

14. Retail customers are segmented by usage: business into three classes and residential households into seven. The user can then specify the distribution of these customer segments for CLECs; a cream-skimming parameter skews the usage distribution of CLEC customers reflecting the extent to which they attract higher-usage subscribers than does the LEC.[14] Households are further segmented into "Total Bill" (or "Proprietary") and "Residual" households. Proprietary customers are one-stop shoppers who purchase all of their telecommunications services from the same supplier.[15] Residual customers are those who purchase local service from the LEC and obtain toll service from an IXC. In the model, all CLEC customers are Proprietary — i.e., they must obtain their local and toll service from the CLEC. LEC Total Bill customers also must purchase all local and toll services from the LEC, and once interLATA competition begins, all of the LEC interLATA customers are Total Bill customers.[16] When a LEC loses a Total Bill customer to a CLEC, it loses all of that customer's local, toll and vertical service revenue; when it loses a residual customer, it loses local and vertical service revenues and the remainder of toll depending on market share.[17] IntraLATA toll service is split between the IXC and the LEC in an assumed proportion.

15. The demand for wholesale services focuses on local interconnection, long distance access charges, and interLATA resale. To gain access to customers, the CLEC can either purchase unbundled loops from the LEC or build its own, and it can connect either type of loop to a LEC

[13] Within the model, when a CLEC uses an unbundled loop to serve its customer, the LEC is assumed to retain carrier access charges.

[14] But not for local exchange services, where the CLEC serves the same proportion of high-volume low-cost customers as the LEC.

[15] LEC Proprietary customers are also known as "Total Bill" customers.

[16] This assumption — combined with the failure of the model to account for cream-skimming for local services — will understate revenue loss from local competition.

[17] Revenue from "other" services — regulated services not elsewhere modeled, including public telephone, customer premises, directory, billing and collection — remains with the LEC and grows over time irrespective of the LEC's share of the local exchange market.

switch or to its own switches. All of these demands are determined as user-specified proportions of total loops in the market. The CLEC's decision whether to compete on a facilities-basis or lease unbundled loops does not depend on the relative prices of those two inputs. CLECs are charged either so-called traditional or non-traditional access charges[18] for terminating long distance calls on unbundled loops, and there is no provision in the model for termination of local traffic by LECs or CLECs.

B. Supply and Costs

16. Aggregate supply is assumed to equal aggregate demand, and the relative outputs of the LEC, the CLEC and the IXC are predetermined by assumptions concerning market share. Costs in the model are largely driven by assumptions made by the user of the model. Levels of incremental costs for loops and usage are assumed along with changes in costs relative to inflation. Changes in costs stimulated by particular events such as competitive losses can be assumed by the user. Initial historical values of embedded costs are hard-wired into the model, and the user can specify an aggregate growth rate for these costs.

C. Productivity Growth and Welfare Changes

17. As a reasonability check for cost and price assumptions, the model calculates total factor productivity (TFP) growth estimates both directly, using the difference in the growth rates of a Fisher-ideal index of input and output quantities, and indirectly, based on the real rate of growth of telephone prices as calculated by the model. This calculation uses a constant depreciation rate of 12 percent, as compared with the constant depreciation rate of 7.3 percent used elsewhere in the model for financial reporting purposes. Under the base case described below, direct productivity growth fell sharply in 1997 and 1998 (at the start of competition) but ignoring those years, the pre-competition (1992-1996) LEC TFP growth averaged 3.7 percent while the post-competition (1999-2010) TFP growth averaged 3.2 percent. Price-based productivity growth fell somewhat from 4.6 percent in the pre-competition period to 3.5 percent in the post competition period.

[18] Traditional access charges are the carrier common line and traffic sensitive carrier access charges in use today. Non-traditional or alternative access charges are a separate set of user-specified prices for loops and usage at which CLECs can originate and terminate traffic in the model.

18. To compare policy scenarios with a base case, the model calculates three sources of change in economic welfare: (i) consumer surplus associated with price changes for loops and usage, (ii) producer surplus associated with changes in after-tax profits of the LEC, CLEC and IXC, and (iii) producer surplus associated with surcharges on total and interstate private line, special access, mobile, cellular and other services offered by LECs, CLECs and IXCs. The calculation of consumer surplus based on the uncompensated demand curve is conventional but has theoretical deficiencies if income effects are important and if the consumer is adjusting simultaneously to price changes for other products or services. Distributional effects of policy decisions also are masked by the reporting of aggregate welfare changes across local and long distance markets.

D. The Base Case

19. The model was supplied with numerous parameters deleted, so that to run the model, NERA had to input values to create its own base case. We chose a scenario in which competition would begin in 1997, and we made assumptions, as required by the model, regarding market share, incremental costs, prices for unbundled elements and the IXC toll resale discount. We generally did not adjust the assumptions for which the FCC supplied data in the spreadsheet. That is, unless needed to simulate a particular scenario, we did not change the FCC's assumptions about prices, access minutes, growth rates for services and other basic inputs the FCC supplied in the spreadsheet.[19] The resulting scenario is reasonable in many respects: prices and productivity growth move slowly over time, and the LEC rate of return increases slowly due to rapid growth in interstate toll. Assumptions for particular inputs into the base case are discussed below.

- Lines 9-12: In the base case and other competitive scenarios, we conservatively priced unbundled loops at approximately the average of residential and business loop TSLRICs in the Cost Proxy Model developed by INDETEC and Pacific Bell. That this wholesale price exceeds the loop retail price in the model is not a problem in the model or in economic theory. Under reasonable parameter settings, an increase in CLEC loop demand decreases LEC earnings, despite the fact that an unbundled loop sells for more than a retail loop in the model. In fact, to compensate LECs, the unbundled loop price should include a portion of common costs, recovery of embedded costs and a reasonable profit. In economic theory, an efficient provider of local exchange and toll service can still use the LEC's unbundled

[19] However, since the model does not allow for simultaneous consideration of resale and unbundling, we estimated the mix of facilities-based, unbundled and resale local competition, and set values in the model as described below to simulate the results.

loop and compete successfully against the LEC since it will just recover its incremental costs from the same services the LEC uses to recover its shortfall.[20]

- Lines 37-40: We assumed full flow-through of carrier access charge changes in IXC prices to be conservative. Past behavior of IXCs has been not to pass through the full amount of access price reductions in lower tariffed prices for interstate services. In general, interstate tariffed long distance prices have not fallen as much as carrier access prices and — net of access charges — interstate long distance prices have fallen more slowly in real terms after divestiture as compared with before. In the model, if IXCs are assumed to pass through none of the changes in access charges, IXC operating profit rises by about 6 percent and LEC EBITDA falls by about 1 percent.

- Lines 41-44: We assumed no flow-through initially of the difference between traditional and non-traditional access charges for CLECs. CLECs are unlikely to possess market power in the toll markets, and if CLECs remain a small fraction of that market, changes in their incremental costs will have no appreciable effect on the market price. To be conservative, half the difference in traditional and non-traditional access charges were flowed through to toll rates once competition begins.

- Line 95: No write-down of embedded investment was taken in the baseline case. All that a write-down accomplishes in theory is to elevate artificially the accounting rate of return on embedded costs in periods following the write-down. A fundamental problem in the interconnection docket is to find a mechanism by which LECs can recover those embedded costs to which they are entitled to an opportunity to recover. Writing a portion of them off the books does not constitute recovery and calculating earnings on such a rate base — to the extent that accounting rates of return have any relevance for interstate telecommunications regulation — has no useful economic or regulatory purpose.

- Line 99: The spreadsheet appears to back out a rate of return and depreciation component from the incremental cost of loops and usage. Assuming that "current incremental costs" are measures of forward-looking economic incremental costs, such a calculation would be incorrect and would understate the change in costs associated with a change in demand. The return and depreciation components of the cost of capital are legitimate sources of economic costs; they are not "profit" in the sense of an excess of revenue above cost.

20. In summary, there are some instabilities in the specification of our base case — particularly during the shift from actual to forecast numbers. Nonetheless, as shown below, when the model is applied to particular policy issues regarding interconnection, the results show that policies that

[20] In addition, CLECs and IXCs would attempt to serve high-volume, low-cost customers and if equally efficient, would be able to recover more than their incremental costs from serving those particular customers.

facilitate underpricing of LEC wholesale services and unbundled facilities or avoidance of carrier access charges result in large reductions in revenue and earnings for the LEC.

III. THE MODEL EXAMINES ONLY A PORTION OF THE RELEVANT FACTS AND CANNOT BE USED TO PREDICT THE ULTIMATE EFFECTS OF IMPORTANT CHANGES IN PUBLIC POLICY.

21. Networks by their nature are interconnected and interdependent, and a model that treats only a part of the system can produce biased estimates of the effects of policy changes on the totality of market participants. The IDSS model is essentially limited to competition among wireline providers of traditional telephone services: it does not recognize competing ways in which telecommunications services are distributed locally to customers such as wireless services or broadband cable. While wireless demand is tracked in the model, all local exchange demand and carrier access demand is assumed to use a wireline loop irrespective of assumed trends in cost and prices through the year 2010. Similarly, demand and incremental costs for local exchange and carrier access services are premised on the use of narrowband wireline loops. Whatever effects cable companies and changing demand for broadband access to the Internet might have, they are outside this model.

22. Even among the services it does model, the IDSS model's treatment of local interconnection is conceptually deficient in three possibly important respects. First, the terms of local interconnection — what a LEC pays to a CLEC to terminate local traffic and what a LEC charges to terminate CLEC local traffic — can have a large effect on LEC financial results. Since the preponderance of traffic served by LECs and CLECs is local, the potential revenue and expense streams when LECs terminate traffic for CLECs and vice-versa could be quite large. The issues of reciprocal compensation or bill and keep for termination of local traffic have been hotly debated in state and federal regulatory proceedings, and the fact that the IDSS model does not consider local traffic certainly limits its usefulness in the policy debates in CC Docket No. 96-98.

23. Second, the relationship between local interconnection (prices, terms and conditions) and carrier access interconnection critically impinges on future LEC financial outcomes. At present, carrier access charges include contribution (price less incremental cost) to support local exchange service. That contribution has been pervasively regulated by the FCC (and state regulators for

intrastate toll, carrier access, and vertical service charges) and subjected for five years to the further efficiency inducements of price cap regulation. Such contribution is perfectly natural in telecommunications markets. For example, consider the interstate toll market, in which AT&T has recently found to be no longer a dominant carrier by the FCC.[21] An average IXC interstate call is currently priced at about 18 cents a minute, while the price of switched carrier access is currently about 6 cents. Assuming carrier access and long distance incremental costs of roughly 1 cent and 2 cents per conversation minute, contribution in switched carrier access amounts to about a nickel per minute (6 - 1 cents) while the remaining contribution collected by the IXC amounts to about a dime.[22]

24. Thus the presence of contribution in carrier access charges does not signal a market failure nor an impediment to competition. And if a policy decision in the interconnection dockets deliberately or accidentally undermines the collection of carrier access charges, another mechanism — possibly less efficient — will have to be found to recover the lost contribution. The IDSS model purports to address the financial consequences of these concerns, but its treatment of terminating carrier access on unbundled loops is such that the model cannot answer the question. In particular, the IDSS model makes a number of assumptions regarding the calculation of terminating access revenues for the LEC. Some of these assumptions apparently cause LEC earnings to be overstated by billions of dollars, so that a policy that appears to be feasible using the model may in fact be financially ruinous.

25. One source of overstated earnings is an apparent overestimate of carrier access minutes from which LECs will receive revenue. In general, the model calculates access minutes by multiplying toll minutes by a constant 1.93 for residential customers. LEC access minutes are the sum of access minutes derived from toll calls originated by LEC residual customers, LEC Total

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[21] Motion of AT&T to be Reclassified as a Non-Dominant Carrier, CC Docket 79-252, Order, Released October 23, 1995.

[22] Contribution kept by the IXC averages 18 - 6 - 2 or 10 cents per minute. Toll and access incremental costs are taken from Robert W. Crandall, *After the Breakup: U.S. Telecommunications in a More Competitive Era*, The Brookings Institution, Washington D.C., 1991, pp. 138-141, and Lewis J. Perl and Jonathan Falk, "The Use of Econometric Analysis in Estimating Marginal Cost," Presented at Bellcore and Bell Canada Industry Forum, San Diego, California, April 6, 1989, Table 2. The costs are obviously averages and vary a great deal across jurisdictions, times of day and technologies.

Bill customers and CLEC customers. Toll calls originated by LEC residual customers are multiplied by 1.93 to derive LEC access minutes because an IXC handles the toll call, and the model assumes that originating and terminating access charges will be assessed at both ends. Similarly, a toll minute originated by a LEC Total Bill customer is assumed to result in no originating LEC access minutes (the LEC carries the long distance call) and the product of 0.93 and the fraction of LEC interLATA calls that terminate outside the region (and thus generate access charges for a different LEC). The IDSS model thus assumes that the LEC always terminates these calls and collects terminating access, regardless of the number of CLEC customers in the market. A more conservative assumption would be that the LEC would not collect terminating access charges for long distance calls that terminate to CLEC customers. Suppose the CLEC share of the local access market were 99 percent and that it used entirely its own access lines (i.e., no unbundled LEC loops). Then when a LEC Residual customer originated a toll call, there would be only a tiny probability (about 1 percent) that the LEC would collect terminating access charges (because 99 percent of the calls would terminate on CLEC facilities). For LEC Residual customers in this case, the ratio of total LEC access minutes to total billed toll minutes would be closer to 1.01 than to 1.93, which is what the IDSS model would assume.[23] For business customers, the IDSS model accounts for LEC bypass using special access for originating traffic by using a lower multiplier (1.49). However, the same multiplier is applied to business toll traffic regardless of the CLEC share of access lines, so that LEC terminating access minutes would be overstated whenever the CLEC share of business local loops was significant.

26. The net result is an overestimate of LEC traditional access minutes, which tends to overstate LEC revenues if local competition is active in the model. When CLEC market share is high, the overstatement is large. Roughly speaking, carrier access represents about $20 billion in revenue of which about 60 percent is associated with terminating access. If CLEC market share were on the order of 25 percent (and CLECs were facilities-based competitors), then LEC access revenues would be overstated by about $3 billion per year ($20 billion X 0.60 X 0.25) which would lead to a substantial overstatement of net revenue, earnings or EBITDA.

[23] Similar overestimates of LEC access minutes associated with toll minutes occurs for toll minutes originated by LEC total bill customers. LEC access minutes associated with toll minutes originated by CLEC customers appear to be correct.

27. Third, the model does not directly address resale of local exchange services. However, it allows one to differentiate between two types of "unbundled" customers — those supplied using the CLEC switch and those supplied by the LEC switch. Using this aspect of the model, one can define a true unbundled customer as one for which the unbundled loop is provided by the LEC but served via the CLEC's switch, and define a "resale" customer as an unbundled customers for which the CLEC relies on the LEC switch. Unfortunately, the model does not allow different prices for these two types of customers and, thus, one cannot assess the tradeoffs that the CLEC would make in selecting among the two approaches to using LEC network facilities within the limits of the model. This is a serious limitation, as an open question in the interconnection docket is the relationship between the pricing and provisioning requirements for unbundled network elements, as required by Section 261(c)(3) of the Act, and the provisions regarding resale of current retail services required by Section 261(c)(4). If CLECs or IXCs are permitted to purchase multiple network elements, they can recreate major parts of the LEC retail service as unbundled network elements and create an opportunity for arbitrage. If resale is thought to be the path by which local exchange competition begins — particularly for IXCs — that element of the competitive matrix is absent from the model.

28. In sum, the financial effects of decisions to be made in CC Docket No. 96-98 cannot be modeled accurately without carefully accounting for all of the costs and revenues stemming directly and indirectly from local interconnection. For example, the competitive effects of losing market share are independent from prices in the IDSS model. Other missing pieces in the IDSS model include local interconnection rates and policies, the interaction of those policies with the collection of carrier access revenues, resale, unbundled network elements and arbitrage, and the effect on LEC, CLEC or IXC demand for retail or wholesale services of changes in relative prices.

IV. ERRORS OR OMISSIONS IN THE MODEL IMPLY THAT SPECIFIC OUTPUTS ARE UNRELIABLE TO AN UNKNOWN DEGREE.

29. All large spreadsheet models are subject to typographical errors and errors in calculations. The IDSS model is no exception. Table 1 shows our current tabulation of apparent errors. We have not attempted to fix all of these, but we believe that the impact of each on the final conclusion is likely to be small. However, a model containing known errors with possibly unknown consequences cannot be used as a guide to public policy.

V. THE RESULTS OF THE MODEL ARE SENSITIVE TO UNKNOWABLE ASSUMPTIONS.

30. Local competition, as envisioned by the Act of 1996, is not yet widely in place, and we have not yet observed the effects of such competition on LEC demand, costs and revenue. Similarly, we have limited experience regarding CLEC entry and their use of unbundled network elements and resale of retail services, the timing of their entry, and the type of customers they will seek and the type they will ultimately serve. Some of this experience will differ depending on how local interconnection develops. Nonetheless, the model requires as inputs parameters that depend on just this type of behavior. While some parameters are unknown but forecastable, others are not really knowable in principle, since they depend, in part, on the outcome of the public policy process the model is constructed to guide. Misjudging some of these unknowables by even a small amount can have a dramatic affect on some outcomes and policy conclusions of the IDSS model. Table 2 shows some of these sensitivities in the IDSS model.

VI. IF USED DESPITE ITS SHORTCOMINGS, THE MODEL SHOWS THAT LEC FINANCIAL RESULTS WILL BE ADVERSELY AFFECTED IF THE FCC ADOPTS CERTAIN POLICIES.

31. Recognizing the limitations of the IDSS model, we nonetheless used it to measure the effects of FCC policies on LEC financial results, including: revenues, market shares, EBITDA, profits and equity value (percent change in stock price). Although in our view, the estimates are <u>not</u> sufficiently accurate to be used as a basis for making specific policy decisions, on its own terms, the model shows that inappropriately designed policies could inflict severe financial damage to the industry, its stockholders, and consumers. Consumer harm would come from inefficient prices that: (i) discourage facilities-based competition; (ii) support less efficient competitors; and (iii) weaken the LECs' ability to compete and provide an advanced telecommunications infrastructure. Such harm could result from setting rates for unbundled network components based on unreasonably low TSLRIC estimates, or setting resale rates based on overstated estimates of avoided costs. In either case, the LECs' less efficient competitors could underprice the LECs even though their incremental costs were higher than the LECs' costs. We also examine the impact of allowing the CLECs to purchase all LEC network components at TSLRIC, and to avoid

terminating toll access charges. In addition, we developed a mechanism that allowed for the simultaneous inclusion of unbundling and resale

32. Base Case. To assess such possibilities, we first developed a base case with reasonable assumptions about the market. The base case we use is one in which:

- nationwide intraLATA presubscription and local competition begin in January 1997, and widespread interLATA relief commences in mid-1997;
- market shares are derived from assumptions reflecting security analysts' reports;[24]
- unbundled local loops are sold at TSLRIC estimates based on appropriate concepts of long run cost;
- no other network elements are unbundled;
- marketing costs are increased to proportions comparable to those of the IXCs;
- resale prices are established assuming that avoided costs are 10 percent of current retail rates and thus that resale prices are set at a 10 percent discount from current retail prices;
- carrier access rates are set using the current pricing structure but on the assumption that they will decline gradually over time based on the FCC specified assumptions in the IDSS model; and
- the mix of resale, unbundling and facilities-based CLEC competition is derived based on expected market behavior.[25]

33. Scenario 1 — Low Unbundled/Resale Rates: Unbundled loop prices are set at TSLRIC from the (Hatfield) proxy cost model, although actual costs are greater in the base case. There is a 35 percent discount for resale of local services (end user access, local usage, vertical services and ancillary services). Market share changes are calculated from assumed values of switching elasticities consistent with the LECG model, and all other assumptions are the same as in the base case.

Results: Compared to the base case, estimated LEC:

- local revenues decline by 2.0 percent in 1998, 5.5 percent in 2000 and 9.6 percent (or $5.8 billion) in 2006;

[24] These assumptions are generally consistent with the assumptions made by Dr. Crandall in the Law and Economics Consulting Group (LECG) model.

[25] These calculations were derived from results in the LECG model so that the base cases of the two models are as similar as possible.

- total toll (both inter and intraLATA) revenues decline by 11.1 percent in 1998, 18.8 percent in 2000 and 25.1 percent (or $16.6 billion) in 2006;
- total revenues decline by 2.9 percent in 1998, 6.7 percent in 2000 and 11.3 percent (or $21.2 billion) in 2006;
- operating profit declines by 6.6 percent in 1998, 21.1 percent in 2000 and 24.9 percent (or $12.8 billion) in 2006;
- EBITDA falls by 3.3 percent in 1998, 10.7 percent in 2000 and 13.8 percent (or $12.6 billion) in 2006; and
- equity value declines by 17.1 percent.

34. Scenario 2 — CLECs/IXCs Avoid Terminating Toll Access Charges and Low Unbundled and Resale Rates: CLECs and IXCs are allowed to bypass terminating toll access charges and pay local termination access charges for toll traffic. All other assumptions are the same as in Scenario 1, particularly the prices of unbundled loops and resold services.

Results: After modifying the IDSS model to allow for such bypass, compared to the base case, estimated LEC:

- access revenues decline by 23.5 percent in 1998, 24.4 percent in 2000 and 25.6 percent (or $5.8 billion) in 2006;
- total revenues decline by 7.0 percent in 1998, 10.7 percent in 2000 and 15.5 percent (or $29.2 billion) in 2006;
- operating profit declines by 28.3 percent in 1998, 38.1 percent in 2000 and 38.3 percent (or $19.7 billion) in 2006;
- EBITDA falls by 14.1 percent in 1998, 20.2 percent in 2000 and 22.1 percent (or $20.2 billion) in 2006; and
- equity value declines by 28.9 percent.

35. Scenario 3 — Complete Unbundling at Low Prices and Low Resale Rates: All loop, port, switch and other network elements are unbundled and prices are set at TSLRIC from the (Hatfield) proxy cost model, although actual incremental costs are unchanged from the base case.[26] This scenario builds on the assumptions in Scenario 1. There is a 35 percent discount for resale of local

[26] This allows IXCs or CLECs to avoid access charges by using LEC unbundled network elements.

services (end user access, local usage, vertical services and ancillary services),[27] and unbundling dominates resale and facilities-based competition and generates more rapid entry and expansion. All other assumptions are the same as in the base case

Results: Compared to the base case, estimated LEC :

- local revenues decline by 12.3 percent in 1998, 12.4 percent in 2000 and 13.1 percent (or $7.9 billion) in 2006;
- vertical service revenues decline by 12.0 percent in 1998, 12.4 percent in 2000 and 11.1 percent (or $1.4 billion) in 2006;
- total toll (both inter and intraLATA) revenues decline by 23.5 percent in 1998, 30.6 percent in 2000 and 30.1 percent (or $19.9 billion) in 2006;
- total revenues decline by 8.4 percent in 1998, 14.5 percent in 2000 and 16.9 percent (or $31.7 billion) in 2006;
- operating profit declines by 42.0 percent in 1998, 47.8 percent in 2000 and 43.9 percent (or $22.6 billion) in 2006;
- EBITDA falls by 19.8 percent in 1998, 24.8 percent in 2000 and 24.9 percent (or $22.8 billion) in 2006; and
- equity value declines by 32.5 percent

36. Scenario 4 — Complete Unbundling at Low Prices and Low Resale Rates: CLECs and IXCs allowed to bypass terminating toll access charges and pay local termination access charges for toll traffic as in Scenario 2. All other assumptions from Scenario 3 are maintained, including the same prices for unbundled network elements and resold services.

Results: compared to the base case, estimated LEC

- access revenues decline by 40.9 percent in 1998, 46.1 percent in 2000 and 56.0 percent (or 12.7 billion) in 2006;
- total revenues decline by 12.1 percent in 1998, 17.5 percent in 2000 and 19.2 percent (or $36.0 billion) in 2006;
- operating profit declines by 62.0 percent in 1998, 60.9 percent in 2000 and 51.1 percent (or $26.3 billion) in 2006;
- EBITDA falls by 30.0 percent in 1998, 31.9 percent in 2000 and 29.4 percent (or $26.9 billion) in 2006;

[27] The price of combined unbundled elements is less than the price of resold local exchange service in this scenario, so that few IXCs or CLECs would choose to resell local service. Thus the effect of resale in this scenario is small.

- equity value declines by 40.2 percent.

37. Figures 1-8 compare the results of the four scenarios. These figures reveal the following pattern of losses.

- **LECs retail line loss occurs in all scenarios, but is more rapid with complete unbundling at low wholesale rates (Figure 1).** Scenarios 1 and 2 show increasing losses in LEC lines sold at retail to the end user compared to the base case in the early years (from 1998 to 2001). The losses are shown by the blue shaded area between the base case line and the line that represents Scenarios 1 and 2. (These scenarios have identical line losses because the only difference between them is in the treatment of terminating access, as described above.) Scenarios 3 and 4, in which all network elements are unbundled in the early years and sold at TSLRIC, would be likely to produce much larger losses in the early years as the IXCs/CLECs could rapidly offer full service to end users with almost no investment in local network facilities and at much lower rates than even the 35 percent resale discount encompassed in Scenarios 1 and 2. The added losses are shown by the striped area between the bottom two lines. The total loss is indicated by the sum of the red and blue shading. In the latter part of the period the losses increase compared to the base case, but the differences compared to Scenarios 1 and 2 are less pronounced as the CLECs phase in the development of their own facilities.
- **The pattern of local revenue loss follow the pattern of line loss (Figure 2).** Taking account of local service, vertical services and subscriber line charges, we see essentially the same pattern of losses in local revenues as in lines.
- **Toll revenue losses build more slowly but reflect the loss of lines (Figure 3).** Since it takes some time for the LECs to capture market share, their pattern of toll losses is more gradual, but the losses continue to mount over time in comparison to the base case.
- **Total revenue losses grow over time in all scenarios and reach from $21 billion with low unbundled and resale rates in Scenario 1 to $36 billion with complete unbundling at low rates and with loss of terminating access in Scenario 4 (Figure 4).** This figure depicts the total revenue loss compared to the base case in each of the four scenarios. It shows that even allowing for any offsetting gains in revenues from unbundling revenue losses are quite severe compared to the base case.
- **Savings in operating expenses are too small to offset the revenue losses (Figure 5).** While there are expense savings in all scenarios, they are inadequate to overcome revenue losses. Note that the total operating expense savings are larger with complete unbundling because there are much larger losses in the early years and, even though LECs do not save additional network expenses, they save on the costs of retailing. There is a small difference in the savings when terminating access charges are avoided (i.e., between Scenarios 1 and 2 and between Scenarios 3 and 4).
- **Operating profits decline from the base case in all scenarios from $13 billion in Scenario 1 to $26 billion in Scenario 4 in 2006 (Figure 6).**